Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Digital Broadcast Copy Protection	)	MB Docket No. 02-230
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REPLY COMMENTS OF PUBLIC KNOWLEDGE AND CONSUMERS UNION

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Public Knowledge and Consumers Union ("Consumer Groups") hereby submit these reply comments in connection with the Commission's *Notice of Proposed Rulemaking*, FCC No. 02-231 (released Aug. 9, 2002) ("*NPRM*") in the above-captioned proceeding. Public Knowledge is a nonprofit advocacy and educational organization that seeks to address the public's stake in the convergence of communications policy and intellectual property law. Consumers Union, publisher of *Consumer Reports*, is an independent, nonprofit testing and information organization serving only consumers.

I. INTRODUCTION AND SUMMARY.

For more than two decades, the Federal Communications Commission ("FCC" or "Commission") and the courts that oversee it have insisted that proponents of any new scheme of regulation establish a substantial factual record in support of such a regulation. It is this general principle, which has persisted regardless of which party occupied the White House or which party controlled the houses of Congress, that has characterized the Commission's regulatory work, especially in the broadcasting arena, for many years now.

It is in light of this general principle that the Consumer Groups find the current proceeding so remarkable — what has become apparent from the filings of proponents of a broadcast-flag scheme is that, despite the obvious energy they have devoted into working out a

broadcast-flag regulation, they have not even gestured in the direction of meeting the burden of proof that such a sweeping and potentially costly regulation requires. In particular, they have not provided ***any*** evidence of a problem attributable to current or future unauthorized copying of "high-quality" digital television (DTV) content over the Internet (other than some content owners' reassertions that there is a problem and/or threats to withhold content if the Commission does not yield to its demands). Nor have they provided any evidence, other than mere assertion, that their proposed solution for this unproved problem is the best solution. Nor have they accurately stated the likely impact such a regulation will likely have on a range of technologies far beyond those understood to fall within Commission jurisdiction, including computer hardware and software, the Internet itself, and the general ability of individuals and enterprises to engage in technological exploration and innovation with regard to these technologies. Moreover, the proponents of this regulation have set out to roll back the Commission's eight-year-old policy to harness the momentum of digital technology growth and innovation to speed the transition to DTV. And not only do they seek to roll back this policy, but they also offer nothing in return — certainly they don't present a near-term timeline for fully committing to 100-percent HDTV broadcasting to the general public. Their demands are all stick and no carrot.

In itself, the absence of any case for a broadcast-flag regulation ought to be enough for the Commission to refuse to go forward, but the problem for proponents of this regulation is even worse than a mere lack of evidence; it is that the available evidence, once gathered, strongly contradicts both proponents' statements that (a) there is a current or future problem with Internet redistribution of digital television and (b) that a broadcast-flag regulation might resolve that problem. The Consumer Groups, as well as other participants in this proceeding, have not stood idly by while the clock ticked away during the reply period. Instead, we have engaged in active investigation of the positions and claims of the various stakeholders in this debate, ranging from public engagement and discussion with major and minor industrial stakeholders, to consultations with independent technologists, to field investigations conducted with our own personnel and equipment.

These investigations include an ongoing colloquy with most major stakeholders involved in the transition to digital television, as well with as those concerned with digital-copyright policy matters generally.[1] These discussions have been helpful in building the Consumer Groups' individual and collective knowledge about the challenges that face copyright holders, product manufacturers, citizens and consumers, and public institutions such as libraries and universities, as our society moves further into the digital age. While the Consumer Groups do not agree with every argument or concern advanced by every stakeholder in the current debates over digital copyright policy, we nonetheless have developed through our ongoing engagement with stakeholders a deeper understanding of those arguments and concerns, and of the technological and legal dimensions of various suggested responses to those arguments and concerns. That deeper understanding, we believe, informs these Reply Comments.

These Reply Comments are further informed by three factors:

> (1) Our ongoing support of the paired goals of promoting both high-definition television (HDTV) and digital terrestrial television broadcasting (DTTV), sometimes referred to together as "DTV."[2]
>
> (2) Our commitment to the Constitutionally based protection of copyright as a spur to the development of new creative works, creativity we believe ultimately benefits consumers and the general public.
>
> (3) Our belief that consumers and the general public have reasonable expectations about, and legal rights with regards to, the functionality, convenience, and cost of consumer electronics and digital technologies.[3]

It follows from the last of these three principles that consumers and the general public have a strong interest in the continued flowering of technological innovation. We believe that

[1] These stakeholders include but are not limited to: major movie studios, music companies, broadcasters, technology companies, consumer-electronics manufacturers, trade associations, librarians, academics, and public-interest organizations, as well as consumer interests and the general public.

[2] As in our original Comments, we use "DTV" in the context of the broadcast-flag discussion to refer primarily to HDTV and secondarily to any other digital "high-quality" television content.

[3] These reasonable expectations include but are not limited to the reasonable, lawful copying of copyrighted works – copying that is legally classified as "fair use." The Consumer Groups recognize that the broadcast-flag scheme allows for some degree of copying, despite some misstatements of our position on this matter, and we are concerned that reasonable consumer expectations in this regard be maintained at minimal cost to consumers and citizens. It is not, however, "fair use" copying that is the focus of these Reply Comments, for reasons that will become apparent.

this consumer and citizen interest is also a Constitutional interest, drawing its force from the same language in Article I that empowers Congress to protect, *inter alia*, literary and artistic works.[4] It is this flowering of innovation (notably in, but of course not limited to, the digital-technology sector) that has consistently fueled our nation's economic and social well-being. At a bare minimum, this means that any government regulation that puts the flow of innovation at risk must be supported by a compelling factual record.

As we have noted above, the proponents of the broadcast flag have not developed such a record in this proceeding. Furthermore, independent empirical investigations of the factual claims made by the proponents of broadcast-flag regulation (or of any similar regulation aimed at protecting digital television content from being copied over "networks such as the Internet"[5]) strongly suggest that there are no empirical data that support even proponents' most speculative articulation of any threat posed to their content by the Internet. We further find that the claims made by proponents of such a regulation are based on incorrect assumptions and are frequently self-contradictory.

In addition, the Consumer Groups believe that the proposed regulation will either slow technological innovation or slow the transition to DTV or both. Considering that there is no evidence of a current or imminent threat posed by the Internet to digital television content, the risks posed by an ill-conceived and unsupportable regulation are even more serious than they would be if they actually solved a demonstrated problem.

If the Commission determines it must nevertheless regulate in this area, the Consumer Groups propose that any regulation that mandates a technological solution must also be effective and proven "in the field" to be the best technological approach. Such a regulation must itself be based on objective, technical criteria for functionality,[6] must allow for innovation, and must not

[4] U.S. Const. Art. I, Sec. 8, cl. 8 ("To promote the *Progress of Science and useful Arts*, by securing for limited Times to Authors and *Inventors* the exclusive Right to their respective Writings and *Discoveries*")(emphasis added).
[5] Comments of the Motion Picture Association of America, *et al*., at i (hereinafter "MPAA, *et al*., Comments"). Occasionally, MPAA, *et al*. refers to "networks like the Internet." *See, e.g*., MPAA, *et al*. Comments, at 7.
[6] *See* IT Coalition Comments at 20-24. We agree with the IT Coalition Comments on the general principle that objective criteria are necessary for any such regulation, but we do not believe that the broadcast-flag proposal offered by MPAA, *et al*., or any similar proposal, could be "saved" even by the inclusion of objective, neutral,

result in the suppression of lawful innovation in other industrial sectors.[7] In addition, consumers should be given adequate notice of, and input into, the mandated technological solution.

Moreover, the Consumer Groups argue in Section IV of these Reply Comments that, should the Commission determine it must regulate to further protect DTV content, the very facts that explain why unauthorized Internet copying of HDTV is neither a current nor near-future threat[8] suggest a regulation that, consistent with the Commission's quality-of-signal jurisdiction, would make the prospect of such copying even less likely than it is now.

Finally, we urge the Commission not to stray beyond its established or expressly granted jurisdictional authority in promulgating, implementing, and enforcing such a regulation. The Consumer Groups continue to believe that the sheer breadth of any comprehensive regulation designed to protect broadcast content through "broadcast flag" or "watermarking" technological standards will mean that such a regulation extends beyond the scope of Commission jurisdiction. Should the Commission nevertheless decide to go forward with such a rulemaking, even in the absence of a record sufficient to support that rulemaking, we believe a specific proposed Rule should have its own Notice and Comment period.[9]

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specific criteria. For technological reasons, we believe that any content-protection scheme requiring the content to be broadcast "in the clear" is inherently and conceptually flawed.

[7] If the Commission, which is not expressly charged with protecting copyright interests, nonetheless determines that it has jurisdiction to protect copyright interests, it seems reasonable to infer that the Commission has an equally strong interest in protecting and promoting technological openness and innovation as well. Article I of the Constitution, op. cit., does not privilege copyright interests over innovation interests.

[8] Obviously, no one can predict with absolute certainty that there will never be a threat to content interests posed by in-the-clear broadcasting of digital television. What we know about intrastructural limitations on the current Internet, however, suggest that whatever threat may be posed won't be associated with the Internet as we know it, or with the Internet as it is likely to evolve in the next decade. At the very least, this consideration suggests that the Commission not act on a broadcast-flag proposal in the near term, since such broad regulation now may actual hinder the technology sector's ability to respond to a genuine threat in the future, if and when it should manifest itself, by requiring "closed" rather than "open" hardware and software architectures. Given that virtually every statement by the proponents of broadcast-flag regulation of the purported threat posed by the current Internet is factually incorrect, it would be prudent of the Commission to approach the question of such broad prospective regulation with thorough deliberation rather than panic-induced or politically driven haste.

[9] The Commission's *NPRM* in this matter did not include the text of an actual proposed Rule. As Attachment B of the MPAA, *et al*. filing demonstrates, a Rule designed to implement broadcast-flag-related mandates can be remarkably complex, and as a result it may conceal in its complexity a large number of policy issues, each of which may require its own thorough consideration.

II. THE ARGUMENTS FOR THE BROADCAST FLAG SCHEME ARE NOT GROUNDED IN EMPIRICAL DATA, ARE BASED ON FALSE ASSUMPTIONS, AND ARE SELF-CONTRADICTORY.

A. There is a Lack of Empirical Data Supporting the Call for a Broadcast Flag.

Not one of the proponents of a broadcast-flag or similar "marking" scheme has adduced a record of empirical data demonstrating a current or imminent infringement problem with digital television that needs a regulatory solution from the Commission. This factor in itself ought to be sufficient reason for the Commission to refrain from imposing such a scheme, especially in light of the breadth such a scheme necessarily must have to be even marginally effective.[10]

To understand and properly assess the absence of empirical data in support of content companies' claims that digital television is in imminent danger of widespread unauthorized copying, one must consider it in the light of two things that we do already know.

First, we must note that some participants in this proceeding have demonstrated that high-definition television content is already substantially available via terrestrial broadcasting.[11] Second, we note that about 10-15 percent of American families are subscribers to consumer broadband Internet connectivity now,[12] and that many students, university researchers, and

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[10] The necessary breadth of any credible broadcast-flag or similar scheme raises jurisdictional as well as evidentiary problems, which we discuss *infra* Section V.

[11] *See, e.g.*, Viacom Comments at 2-4. Viacom notes, *inter alia*, that "In the 2001-2002 season, all but one of CBS's scripted prime-time programs were broadcast in HD. And for the 2002-2003 season, CBS is offering all 19 of its prime-time comedies and dramas in HD." *Id.* Other content providers have made similar representations to the Commission. It is difficult to avoid the inference that the slowness of consumer adoption of digital television is attributable to factors other than any lack of compelling HDTV content.

[12] Consumer broadband connectivity (e.g., via cable modems or digital-subscriber-line (DSL) modems ranges from 256 thousand bits per second (Kbps) per second to 1.5 million bits per second (Mbps). So-called "business DSL" (a digital subscriber line, typically provided by a telephone company) ranges from 768kbps to 1.5 Mbps. Due both to "last mile" infrastructure limitations and to the architectural limitations of the Internet itself, the actual throughput on consumer broadband bandwidth is unlikely to increase significantly in the next decade. Indeed, the infrastructural limitations on consumer broadband have led to service-provider "capping" of upload and download bandwidth, which is necessary to ensure that no single subscriber's bandwidth usage under limited-infrastructure conditions denies too much bandwidth to other subscribers.

It also is important to remember in the context of assessing the likelihood of large scale copying of HDTV content over the Internet that most consumer broadband connectivity is "asymmetric" -- that is, the "upload" speed of a consumer Internet connection is limited to only a fraction of its "download" speed. To put the matter simply: even if you have a nominal 1.5 Mbps connection, if the person you're downloading the HDTV file from has only 200-kbps upload capability on his server, your top download speed will be limited to 200-kbps by his upload capability. Moreover, Internet transmission of files typically requires that file packets are routed through various "chains" of computers before arriving at their destination — this is what we mean when we refer to "architectural limitations" on the Internet. This means computers in the chain of packet-copying that have lower bandwidth may

workers at government and private-industry facilities already routinely have access to higher-bandwidth Internet connectivity, such as a shared T3 connection.[13]

The latter consideration — current access to broadband connectivity — together with the acknowledged current availability of many hours of HDTV content per week and the purported ease by which HDTV content broadcast "in the clear" can be "redistributed," raises an important question: Why do proponents of the broadcast-flag scheme (or similar schemes) currently offer no evidence of significant (or even noticeable) infringement of HDTV content on the Internet?[14]

The absence of such evidence cannot be due to an absence of HDTV tuners. There are approximately 300,000 – 500,000 HDTV sets that incorporate or are connected to broadcast digital tuners in the field as of this filing. Those HDTV broadcast receivers were not constructed with built-in copyright-protection technologies[15] — in general, they are capable of passing copyrighted content through digital or analog interfaces to "downstream devices," including personal computers.[16] It follows from these factors that if, as MPAA, *et al*. state in their comments, "[b]ecause it is transmitted in the clear, digital broadcast television is subject to an extraordinarily high risk of unauthorized redistribution[17] over networks such as the Internet," we

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act as "bottlenecks" for the transmission of large files, even when the origin computer and destination computer have high-bandwidth connections.

[13] A "T1" Internet connection, generally shared by multiple users, is capable of signal transmission at 1.5 Mbps. A "T3" Internet connection, typically so expensive that it must be shared by many users at a public, private, or government institution, is the equivalent of 28 T1 connections, or 45 Mbps. T1 and T3 connections are generally "symmetric" -- that is, they allow uploads at the same bandwidth that they allow downloads -- but this feature of such connections means they are relatively expensive, and typically beyond the means of ordinary consumers. The expensiveness of high-bandwidth connectivity is generally a function of infrastructure -- our existing communications networks (primarily copper cable sometimes supplemented by fiber optic cable) are generally incapable of supporting large numbers of T1 or T3 connections to the home.

[14] We also note that the absence of any evidence of HDTV file copying over "networks such as the Internet" makes it impossible to calculate any benefit to copyright holders from instituting a broadcast-flag scheme. Thus, the absence of such evidence skews any cost/benefit analysis to disfavor such a scheme.

[15] No proposed broadcast-flag regulation addresses the question of whether legacy HDTV tuners with digital outputs and/or analog outputs constitute, in effect, a "legacy hole" for unlimited redistribution of commercial content.

[16] We assume but cannot state with certainty that HDTV content is also currently being delivered via cable and satellite-based transmission to set-top boxes and tuners in devices that are capable of passing that content on to "downstream devices" without restriction. Even if we limit this discussion to HDTV broadcast tuners, however, it seems certain that, if HDTV content were as copyable as proponents of a broadcast-flag or similar regulation say, we would already be seeing some evidence of this copying on the Internet. No such evidence has been adduced by the broadcast-flag-scheme proponents.

[17] Because "redistribution" of content over the Internet occurs by making copies of that content, we use "redistribution" and "copying" interchangeably in this filing. We believe over reliance by the proponents of the

should be seeing some evidence of unauthorized HDTV copying today. Nevertheless, proponents of Commission rulemaking in this area do little more than assert the threat without demonstrating any sign that any threat exists. In the absence of such a factual showing, we believe the Commission is constrained from adopting the proposed broadcast flag scheme.[18]

We do not deny, of course, that there is some evidence of unauthorized copying of analog television content, which, like HDTV, is broadcast "in the clear" (broadcast in unencrypted form). Indeed, because analog-TV content is much lower in resolution than HDTV, it can be digitized quickly and reduced to an MPEG-1[19] file that, while lower in resolution even than standard NTSC analog television,[20] many individuals may find acceptable for viewing. Our independent investigations of file-trading networks and applications such as Kazaa, Gnutella, Morpheus, and Drumbeat indicate that, while episodes of current and recent television shows are

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broadcast flag scheme on the words "redistribution" or "retransmission" to refer to Internet distribution of content may obscure the fact that such "redistribution" and "retransmission," which occurs as the result of copying, necessarily raises legal and policy issues that heavily implicate our system of copyright laws. Because the interests protected by the Copyright Act are Constitutional interests -- *see* U.S. Constitution, Article I, Sec. 8 -- it is particularly important that the Commission not act in a way that treads upon Congress's Constitutional prerogative to set and protect the balances of interests embodied in our copyright laws.

[18] *See, e.g*., *Time Warner v. FCC*, 240 F.3d 1126 (D.C. Cir. 2001). *See also Fox Television Stations* v. *FCC*, 280 F.3d 1027 (D.C. Cir. 2002)(striking down newspaper-broadcast cross-ownership and cable-broadcast cross-ownership rules); *Sinclair Broadcasting v. FCC*, 284 F.3d 148 (D.C. Cir. 2002)(remanding local broadcast ownership rules). In *Time Warner*, the D.C. Circuit struck down the Commission's horizontal and vertical ownership limits on cable operators. In rejecting the Commission's unsupported claim that the horizontal ownership limit was necessary to protect a programmer against collusion to deny carriage by two or more cable operators, the D. C. Circuit, relying on *Turner I*, 512 U.S. 622, 664 (1994), made clear that, when promulgating regulations "the FCC [must] do more than 'simply "posit the existence of the disease sought to be cured.'" It requires that the FCC draw 'reasonable inferences based on ***substantial*** evidence.'" *Time Warner*, 240 F.3d at 1133 (Citations omitted and emphasis added). Moreover, in rejecting the vertical ownership limits promulgated by the Commission in the interest of "diversity in programming and fair competition," the court stated: "[T]o pass even the arbitrary and capricious standard, the agency must at least reveal "'a rational connection between the facts found and the choice made.'" *Id.* at 1137. In the instant proceeding, not only does the Commission lack any evidence of actual transmission of "high-quality" DTV content, the evidence before it suggests that such transmission is unlikely and will remain extremely difficult for the foreseeable future.

[19] "MPEG-1" is a digital-video-content compression standard developed by the Moving Picture Experts Group (MPEG) a working group of ISO/IEC (International Organization for Standardization/International Electrotechnical Commission) in charge of the development of standards for coded representation of digital audio and video. "Established in 1988, the group has produced MPEG-1, the standard on which such products as Video CD and MP3 are based, MPEG-2, the standard on which such products as Digital Television set top boxes and DVD are based, MPEG-4, the standard for multimedia for the fixed and mobile web and MPEG-7, the standard for description and search of audio and visual content." *See* MPEG website, *at* http://mpeg.telecomitalialab.com/.

[20] MPEG-1 resolution is commonly 240 pixels from top to bottom and 320 pixels from side to side. By comparison, standard-definition television is 480 lines from top to bottom in the visual field.

frequently listed as available,[21] they are invariably large in size (often as much as 1.2 gigabytes in size for an hour of programming),[22] yet invariably lower in resolution and quality than that of the NTSC analog television from which they were derived.[23]

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[21] Although the lists of available television episodes on file-trading networks suggest that at least some unauthorized copying of NTSC content is occurring, it would be risky to infer from these lists that any significant number of unauthorized copies even of NTSC television content is actually being downloaded. There are currently no reliable means of measuring actual downloads of these files, and the large file sizes of even low-resolution NTSC content, together with the bandwidth limitations of consumer broadband, suggest that the actual volume of file-trading in such content is probably low and will remain low. See the following footnote for further elaboration on this point.

[22] An hour of television programming can be reduced to a standard MPEG-1 file of less than 650 megabytes in size (.65 gigabytes), but some digitizers such as El Gato's eyeTV, which retails at $199.00, enable the capture of a "higher-quality" version of that format, based on increasing the data rate of the presentation, in bytes per second per frame. (The resolution of that "higher-quality" format will remain 320 pixels by 240 pixels, however -- lower than that of NTSC's 480i analog television.).

If we assume that an MPEG-1 file of an hour of programming is about 650 megabytes in size, its size can also be stated as "650 million bytes." Since each byte is composed of eight bits (the basic unit of digital information,) an hour of programming equals about 5.2 billion bits. If the average consumer-broadband connection has top official bandwidth of 512 Kbps, and if the consumer using that connection were able to download the file at speeds that approach the full 512Kbps (unlikely, given that consumer broadband bandwidth is shared with other local broadband users, and given that the sender of a given file may have less transmission bandwidth than the recipient does; this hypothetical also assumes the downloader is engaging in no other computer use during the download), it could nevertheless take about more than two hours for the consumer to download a lowered-resolution version of an analog-television broadcast of an episode of "CSI: Crime Scene Investigation." In our investigations of file-trading over consumer-grade broadband connections, we rarely found that downloading a file exceeded even half the official maximum bandwidth. Nevertheless, let us optimistically assume that sometime in the next decade the average maximum download bandwidth of consumer broadband will increase to about 1 Mbps and consider what effect this might have on transmission over the Internet of digital television. An hour of SDTV (480 lines, progressive, transmitted per ATSC standards in MPEG-2 format at an effective rate of 4 million bits per second) could theoretically take as little as four hours. But an hour of 1080i HDTV, which is transmitted in MPEG-2 format at an effective rate of 18 million bits per second, would take a theoretical minimum of 18 hours to download, assuming absolutely optimum conditions, including the aforementioned doubling of consumer-broadband capability. An hour of 720p/60 content in MPEG-2 would take a theoretical minimum of 14 hours to download. This suggests a regulatory approach that, should the Commission conclude in spite of the absence of evidence that there is a serious problem with unauthorized redistribution of digital television, would be both more effective and less expensive than the broadcast-flag approach. We will discuss that alternative *infra* in Section IV.

[23] Just as NTSC programming captured in the standard MPEG-1 format can be improved by changing the data rate of the presentation (see preceding footnote), it also can be reduced to MPEG-1 format in even lower quality, of course -- e.g., in a resolution of 160 pixels by 120 pixels). It also can be digitized and compressed into somewhat smaller files in "lossy" formats such as MPEG-4, but use of lossy compression, by definition, will result in a loss of information and quality. We understand from public statements by content-owning stakeholders that the low-quality reproduction of commercial content is not the problem they are concerned with in the context of supporting the broadcast-flag scheme. Instead, the concern has been that aftermarket sales or licensing of "high-quality" (*e.g.*, high-definition) versions of the content will be eroded. Moreover, the fact that NTSC programming can be reduced to far smaller files than can HDTV programming (even assuming lossless compression of the NTSC content) suggests that the real threat of copyright infringement for television content producers lies in analog television, not digital television. For this reason, we believe, if file trading of television content truly were the problem that content providers say it is, those content providers would be better protected if the Commission mandated that analog television broadcasting cease sooner rather than later. *See also infra* the discussion in Section IV.

B. The Assertions Behind the Call for a Broadcast Flag Are Incorrect.

MPAA, *et al*. asserts without evidence a number of propositions about the purported threat of retransmission of commercial content over "networks such as the Internet" that are, as a purely factual matter, untrue. These unsupported assertions regarding the purported threat of unauthorized copying include but are not limited to the following:

> "Once received in the home, digital broadcast television content can easily be redistributed via retransmission over networks like the Internet by such means as rebroadcasting, hosting files on a web server, or peer-to-peer file trafficking."[24]
>
> "Or that person can easily e-mail the file as an attachment to an unlimited number of people."[25]
>
> "The capability of the Internet to allow distribution worldwide, instantly, to millions of recipients, distinguishes the looming threat of digital piracy from previous technologies, such as the VCR, that relay on the creation and distribution of physical copies."[26]
>
> Trading TV content is "easy to accomplish."[27]
>
> "…[T]he threat of widespread piracy is enormous, even if the number of pirates is low."[28]

In the Consumer Groups' initial comments in this proceeding, and in these Reply Comments, we have discussed the reasons that even the file trading of digitized, low-resolution NTSC television content is slow and difficult, even under the best of conditions.[29] As even the most casual experimenter in video file-trading can attest, a successful download of digitized TV content never occurs "instantly." Nor do e-mail services "easily" allow e-mail messages with TV-content file attachments to pass through to the Internet (primarily because few Internet Service Providers, if any, have the ability to store large numbers of temporary copies of 600-

[24] MPAA, *et al*., Comments at 7. In general, when the MPAA, *et al.* Comments or their Reply Comments use words like "easily," "instantly," "instantaneous," or "instantaneously" in a present-tense statement about present or foreseeable Internet transmission capabilities, that statement is factually incorrect. For a discussion of these inaccuracies, *see generally* Reply Comments of Edward W. Felten in this docket.
[25] *Id.*
[26] *Id.*
[27] *Id.*
[28] *Id.*
[29] *See supra* footnotes 21-22.

megabtyte-or-larger files while waiting for the e-mail transmission to complete).[30] Nor are these limitations on bandwidth and throughput likely to change in the near future.[31]

C. The Case For a Broadcast Flag Scheme is Internally Inconsistent and the Requested Regulatory Remedy is Overbroad.

There are several striking inconsistencies in the arguments made in support of a broadcast flag. First, MPAA, *et al*. argue that the proposed regulation regulates "a minimum number of products" and that it is technically sufficient to achieve the desired goal, but then goes on in great detail in its proposed Rule to enumerate a great range of products that will be regulated, including the surprising addition of "modulators" (hardware and/or software capable of VSB or QAM modulation).[32] If the broadcast-flag scheme were technically sufficient and limited in scope, there would be no need to include open-ended descriptions of "covered" devices and products. Nor would there be a need to add modulators as a class of "covered" products. (The proposed regulation of modulators does not in itself further the broadcast-flag scheme of protection. Instead, that regulation represents an attempt to solve a problem that is apparently

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[30] For a more thorough discussion of the difficulties of transmitting HDTV files over the Internet through e-mail or other means, *see generally* Reply Comments of Raffi Krikorian. Krikorian's Reply Comments make our calculations of file-download time, *supra* footnote 22*,* look exceedingly optimistic by comparison.

[31] For a complete discussion of the reasons that "last mile" bandwidth increases only incrementally even though computing power doubles approximately every 18 months, consistent with Moore's Law, *see Broadband: Bringing Home the Bits*, Committee on Broadband Last Mile Technology, National Academy, 2002. "The ratio of performance to cost of computers continues to grow rapidly (a phenomenon closely related to Moore's law, which says that the number of transistors on an integrated circuit doubles every 18 months), and communications rates should grow at a similar pace. To keep pace with processor speed, disk size, and so on, communications should become 10 times faster every 5 years.… But in the residential market, it has taken a very long time to surpass dial-up speeds, and there are fears that motivation will be lacking for the service providers to invest in a way that will provide ongoing improvements in speed. Broadband deployment may stall at a speed that is an improvement over dial-up but which does not keep pace with what is needed, thus acting as a brake on the computer industry. Similarly, operators of other segments of the network (i.e., backbone Internet service providers [ISPs] and long-haul data carriers) may view the last mile is a potential bottleneck to growth in their traffic volume and revenue." *Id.* at 47. "In the meantime, the investment climate for major telecommunications infrastructure upgrades is uncertain…. Notwithstanding these and other challenges, the Committee on Broadband Last Mile Technology has attempted to put forth, by consensus, views about the broadband last mile that seek to have value in the 2- to 10-year time frame. While such a time frame might seem to be daunting in the face of the rate at which some of the basic technologies are advancing (Moore's law and its kin), the processes of deployment and acceptance have always proceeded much more slowly, and there seems to be no particular reason to expect a significant change in these time constants going forward." *Id.* at 61. The Committee on Broadband Last Mile Technology is a component of the National Research Council, which itself is part of the National Academy of Sciences. The report is *available at* http://books.nap.edu/books/0309082730/html/index.html.

[32] *See* MPAA, *et al*., Comments at 14-17. *See also* MPAA, *et al*., Comments at Attachment B, Robustness and Compliance Rules 17-20.

created by the broadcast-flag scheme — a problem undermining other content-protection schemes. "Regulation of modulators is necessary in order to prevent other content protection systems from being undermined by the very rules necessary to protect digital broadcast television content."[33] MPAA, *et al*. further suggest that the broadcast-flag scheme is apparently a threat in other ways as well.[34]) As the Veridian Reply Comments observe, encryption of content at the source requires far less Commission regulation of devices,[35] since individual users will be able to "opt in" to receive protected content through secure channels.[36]

Second, MPAA, *et al*. argues that the broadcast-flag scheme relies on "a flexible, market-based approach" for admission of technologies to Table A, yet in actuality proposes that subsets of "3 Major Studios" or "Major Television Broadcast Groups" or "10 Major Device Manufacturers" decide in advance whether technologies can be admitted. The Consumer Groups take no position on whether such an approach is "flexible," but are certain that "market-based" is an inapplicable adjective to an approach that requires approval by collections of "Major" companies. ("Minor" companies apparently need not apply.) The invocation of markets in this context appears to be the fig leaf for a fundamentally anticompetitive scheme that seems certain to "lock in" 5C or 5C-affiliated technologies, and perhaps one or two others. (As it happens, the technologies listed as already appropriate for Table A are essentially just components of a single comprehensive technological scheme. This scheme is based on the set of technologies that are informally called "5C," which include DTCP, HDCP, CPRM, and perhaps D-VHS. Technically speaking, the 5C Consortium — Hitachi, Intel, Matsushita, Sony, and Toshiba — is responsible

[33] *See* MPAA, *et al*., Comments at i.
[34] *See* MPAA, *et al*., Comments at 18, Footnote 8.
[35] "If, for example, protecting ancillary and supplementary services is what it takes to fix the problem of holding back premium content, the cost implications of an encryption-based solution are limited to the receive equipment of those consumers interested in receiving the services in question." Veridian Reply Comments at 4.
[36] Veridian does suggest that the Commission has a role to play in standard-setting for encryption at the source. Veridian Reply Comments at 20. The Consumer Groups do not believe encryption at the source is required to protect HDTV or other "high-quality" content because the content companies' have not provided substantial evidence of a copying or "redistribution" problem relating to "networks such as the Internet." Nevertheless, should the Commission determine that such a problem exists, and then proceed to mandate encryption of HDTV content at the source, the Commission might well play a constructive role in general standard-setting, so long as the standards set do not "pick a winner" in the marketplace.

only for developing DTCP, but the consortium has actively promoted a single technological scheme that integrates DTCP with the other technologies named in the MPAA, *et al*. Comments. That scheme is essentially non-interoperable with alternative protection schemes, unless they also license and incorporate one or more of the 5C technologies.).

That the Commission might nominally be a "safeguard" against anticompetitive behavior means little, since the makers of an alternative protection technology that did not win "Major" company approval would be faced with two hurdles: (a) winning an appeal to the Commission for approval, and (b) competing against an installed base of "Major" company-approved technologies. It would not be surprising, in the face of such hurdles, for a technology company to allocate its research and development assets to likelier projects.

Third, MPAA, *et al.*'s broadcast flag scheme undercuts the claim that the broadcast flag approach is the best approach. Because their scheme does not address analog outputs, it is necessarily incomplete. We know this because the proposed rules expressly allow "analog outputs" on covered devices,[37] even though MPAA, *et al*.[38] and others[39] know that analog outputs are capable of transmitting high-quality content in ways that allow for digitization and subsequent digital copying. That analog outputs are excluded from the regulation in spite of the fact that such outputs create a so-called "analog hole" is a factor that effectively demolishes any content-protection value a broadcast-flag scheme might have. The Consumer Groups believe that it will be extremely difficult to regulate such outputs, and that, for theoretical reasons, the "analog hole" problem is fundamentally insoluble, absent the abolition or extremely broad global regulation of analog-digital and digital-analog converters.

We recognize that the Commission may take the approach that says, in essence, "By implementing the broadcast-flag scheme we're doing what we can, and an analog solution will come later. Therefore, let's deal with what's in front of us now." The problem with this

[37] *See* MPAA, *et al*., Comments at 27; MPAA, *et al*., Comments Attachment A at 5.
[38] *See, e.g., infra* footnotes 40-41.
[39] *See generally*, the Consumer Groups Comments, Comments of Computer & Communications Industry Association, Comments of the Electronic Frontier Foundation.

approach is that in the absence of any clear solution to the problem of "analog" conversion and subsequent redigitization, the broadcast flag scheme's incompleteness will render it entirely useless as a solution, at least technically speaking. Fritz Attaway,[40] the Washington General Counsel of the MPAA, and Andy Setos,[41] the Fox Entertainment Group executive who oversaw the development of the broadcast-flag technological standard, have each publicly admitted as much. The fact that the broadcast-flag approach, even considered in the kindest light by its strongest advocates, is at best incomplete, undercuts both MPAA, *et al.*'s claim that there is no technical impediment to implementing the scheme (ineffectiveness qualifies as a technical impediment, in our view) and that there is need to bring about this regulation quickly, since there is no generally agreed-upon effective technology for closing the "analog hole." Many technologists believe the analog-hole problem to be essentially insoluble[42] and almost all agree that the problem is a difficult one and that no obvious solution to it is near — as a result, it is

[40] Comments of Fritz Attaway, Washington General Counsel of the MPAA at the "Battle over the Broadcast Flag: The IP Wars and the HDTV Transition," CATO Institute Policy Forum (Feb. 5, 2003) *at* www.cato.org/events/030205pf.html. "Some people say, well, uh the FCC doesn't need to get involved, there should be encryption at the source, that's a better solution - and in fact it probably is a better solution…." *Id.* at time index 16:14. "You're absolutely right; the analog hole is an issue that applies across the board." *Id.* at time index 47:21.

[41] Comments of Andy Setos, President of Engineering, Fox Entertainment Group, at the "Battle over the Broadcast Flag: The IP Wars and the HDTV Transition," CATO Institute Policy Forum (Feb. 5, 2003) *at* www.cato.org/events/030205pf.html. "The fact is that this has to be seen as a complimentary part to a total solution …so the flag is just one component and no one's made any secret of the fact that there is this analog-reconversion problem…one or the other isn't sufficient, they're both necessary. Characterizing the flag as 'it will only do a, very little, ahh, yes, you are right if nothing else happens. We need to have more success at managing legacy technologies… Alone it [the broadcast flag] doesn't really ring any bells, because there are so many work-arounds." *Id.* at time index 47:32.

[42] The problem for would-be closers of the "analog hole" is this: the only schemes that have been suggested involve placing invisible digital "watermarks" in digital content that survive digital-analog conversion and analog-to-digital reconversion. Such watermarks also must meet other criteria -- they must be sufficiently "invisible" that they do not interfere with an audience's experience of the content, yet sufficiently "findable" that any machine can find it routinely in any part of the content. They also must survive digital compression, yet digital compression of audiovisual content routinely removes information that is "invisible" to the audience. For a more technical discussion of this problem, *see* Paul B. Schneck, "Persistent Access Control to Prevent Piracy of Digital Information," 87 Proc. of the IEEE 1239, 1240-41 (1999). "The very nature of watermarks as subtle patterns is the source of a significant limitation in their use. Compression techniques, employed to reduce the space and transmission time of files representing sounds and images, often fail to preserve the low-order (least significant) bits. These are precisely the bits on which the watermark is carried. Use of other bits would render the image (too) degraded." *Id*.

unlikely that an incomplete protection scheme such as the broadcast-flag scheme can be completed quickly with a fix for the "analog hole."

Fourth, Viacom's threat to refuse to broadcast HDTV in the future if the broadcast-flag protection scheme is not implemented[43] unwittingly undercuts proponents' argument that a flag is necessary. We note at the outset that the very threat demonstrates that Viacom has been willing to broadcast HDTV content in an period in which one hundred percent of the half-million receivers already sold have been able to receive and, if MPAA is to be believed, retransmit or copy this "in the clear" content with impunity. In effect, Viacom is saying that as of December 2002, the company will continue to broadcast HDTV content in the clear, even though existing HDTV tuners can receive it and retransmit it without restriction to unprotected devices, and even though those legacy unprotected tuners will continue to be used for years to come, and even though many more unprotected HDTV tuners will be sold while the Broadcast Flag Rule is implemented. But if the Commission doesn't act by fall 2003, Viacom is saying, the company suddenly will care enough to remove its HDTV content from the airwaves and risk losing the spectrum allocated to its broadcasting divisions, not to mention alienating or losing altogether its broadcasting affiliates. Not only do the Consumer Groups doubt Viacom will want to take these risks, but we also doubt that Viacom will surrender the additional six megahertz of spectrum it was allocated for development of DTV.

Of course, Viacom may have felt compelled to make this threat, since its CBS division already broadcasts all of its scripted entertainment shows in HDTV format. That inconvenient fact seriously weakens any claim that lack of a protection scheme for broadcast content was preventing high-quality DTV content from being broadcast and a lack of high-quality DTV content has been slowing consumer embrace of the DTV transition.

[43] "[I]f the broadcast flag is not implemented and enforced by next summer, CBS will cease providing any programming in high definition for the 2003-2004 television season." Viacom Comments at 12.

III. ADOPTION OF THE PROPOSED MPAA RULE WILL SLOW THE DTV TRANSITION AND LIMIT INNOVATION AND COMPETITION.

A. Adoption of the MPAA's Proposed Rule Will Eliminate the "Convergence Advantage" Behind the ATSC DTV Standard-Setting.

The Commission's *Fourth Report and Order* on ATSC standard-setting assumes that computer-industry innovation and pursuit of interoperability with television receivers and related products will help drive the transition to DTV:

> "39. Third, we conclude that incorporating the DTV Standard into our Rules will encourage technological innovation and competition. In particular, we conclude that our decision not to specify video formats will result in greater choice and diversity of equipment, allow computer equipment and software firms more opportunity to compete by promoting interoperability, and result in greater consumer benefits by allowing an increase in the availability of new products and services. By not adopting video formats, we are allowing consumers to choose which formats are most important to them. Thus, we avoid the possibility that we could inhibit development of services which might, in fact, draw consumers more readily to embrace digital broadcasting and thus, hasten its adoption. By not specifying video formats in this respect we foster competition among those aspects of the technology where we are least able to predict the outcome, choosing instead to rely upon the market and consumer demand."[44]

As is evident from the *Fourth Report and Order*, the Commission has expressly stated it is important that ATSC standard-setting be designed to take advantage of convergence, resulting in cheaper displays, innovative digital services, and other digital-technology offerings, in order to speed the transition to DTV and to maximize its benefits. ***The broadcast-flag scheme is expressly designed to put limits on the design, development, and interoperability of information-technology products, and effectively to outlaw a number of products that are on the market today. It does so by putting limits on interoperability between DTV equipment and computer equipment, and by making these limits "robust" and "untamperable," which makes it impossible to examine and modify such equipment in order to innovate with and improve it.*** Thus, a rule that mandates a broadcast-flag scheme puts the Commission in the unhappy position of facing two different, but equally problematic scenarios.

[44] *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, *Fourth Report and Order*, MM Docket No. 87-268, 11 FCC Rcd 17,771, 17,789 (1996).

The first scenario is that the Commission, by putting up a regulatory wall between television technologies and today's open computer technologies, may essentially halt convergence (and roll back Commission policy as stated in the *Fourth Report and Order*) since only specially modified information-technology products will be able to interoperate with DTV tuners and receivers. If we conclude as the Commission did in 1996 that convergence can be harnessed to speed the DTV transition, it follows, then, that halting convergence clearly will slow the transition to DTV, at least as it has been directed so far. Yet having the Commission halt this convergence through a rulemaking seems to be the direction in which the MPAA, *et al*. wish the Commission to go: "Computers and other general purpose products may thus elect not to commit to comply with the Requirements, and in that case may continue to serve other purposes but may not receive flagged digital broadcast content," the MPAA, *et al*. Comments suggest.[45]

It might be argued that such a rule is not truly barring convergence, since computer-industry compliance with the requirements is something the industry "may thus elect" not to. But the words "may not" signify a flat prohibition insofar as open-architecture computer hardware and software are concerned, and it is open-architecture hardware and software that have made the computer revolution possible by making it easy for programmers and engineers — and hobbyists and students — to go to work "under the hood," creating new products, or new applications for existing ones. Put up a wall between open-architecture digital technologies and DTV, and you have deprived the DTV transition of the "convergence advantage."

The second scenario facing the Commission is this: a rule of the sort proposed by MPAA, *et al*. may kill the "convergence advantage" another way. If we assume for the sake of this scenario that a majority of future computer buyers will want to watch DTV on their new laptops and desktop computers, this fact will create perverse incentives for computer makers to make all their products compliant with the rule in order to be able, at least potentially, to view

[45] MPAA, *et al*., Comments at 15.

DTV. We assume that few manufacturers will want to create two lines of products — one to participate in the home network and the other to stand dumbly aside. Most manufacturers will want to ensure that their devices are easy to use and interoperable with all the other devices in the home. So, even though by intervening in the computer market with its rule the Commission will be in the position of having caused a ***kind*** of "convergence," it will have done so by killing the open-architecture principles that are responsible for the "convergence advantage" of ongoing innovation and exploration through "tamperable" hardware and software. This scenario too seems contrary to the spirit of the *Fourth Report and Order*.[46]

B. Untamperability Requirements Will Damage Open-Source Software Competitiveness and May Seriously Damage that Sector of the Software Industry.

The MPAA, *et al*. asserts the following:

> "Similarly, the Broadcast Flag solution will not, in itself, interfere in any way with continued innovation in the development of open source software. While building a secure open source protection technology will no doubt be a challenge, it is a challenge faced by open source programmers in developing *any* secure application, not just Authorized Digital Output Protection Technologies or Authorized Recording Methods. We welcome the efforts of open source programmers to meet this challenge and develop secure digital output protection technologies and recording methods for submission for inclusion on Table A."[47]

This assertion demonstrates a lack of understanding both of digital-security technologies and of the nature of open source software such as GNU/Linux or FreeBSD. Such operating systems frequently provide secure digital-transmission products and services such as "OpenSSH" — a program that provides secure encrypted communications between two "untrusted" host computers over an insecure network. OpenSSH and similar open-source programs demonstrate that it is possible to create effective security products that do not rely on being "untamperable," since their source code is open, well-known, and widely tested.

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[46] A better alternative, if we assume the Commission mandates some sort of encryption-based approach to protection of high-quality content, would be Veridian technology (*see* Veridian Comments, at 3-4) that—in contrast to the broadcast-flag—allows computer architecture to be open while maintaining security and allows consumers to opt-in for specific special content by purchasing "tickets."

[47] MPAA, *et al*., Comments at 13.

Indeed, OpenSSH's "tamperability," a function of the fact that the program's source code is public and widely available, is what has led to its current robustness as a security tool, because any early flaws were quickly apparent to a number of users and programmers, who then refined the subsequent releases immediately. To put the matter simply, any person may design a security program so robust that he cannot himself imagine a means of breaking it, but that nevertheless can be broken. Disclosure of the source code — a central feature of GNU/Linux[48] and all other open-source operating systems and software — enables programmers and designers of open-source security software to ensure that vulnerabilities are quickly discovered and repaired, often by the end user. "Untamperable" security products, in contrast, can only be discarded and replaced when flaws are discovered.

The incorrect assumption behind MPAA, *et al.*'s statement here, and behind their proposal generally, is that security can be derived only by making security technologies "untamperable." Put another way, MPAA, *et al*. seem to believe that nontamperability of security tools is a necessary part of what makes them secure, but the open-source software movement has demonstrated that this belief is incorrect, and that, in fact, the converse can be true. Nevertheless, they have asked the Commission to implement a security architecture that necessarily excludes open-source software, despite the security advantages we mention here. Because open-source software is currently one of the few strong competitors to Microsoft in the operating-system marketplace, a rule that insists on "untamperability" of any software relating to broadcast or display of television will in effect have damaged the competitiveness of open-source offerings, especially in an era in which media-display and media-playback software (or

[48] "GNU/Linux, sometimes referred to popularly simply as 'Linux,' is a computer operating system whose source code, as well as the source code for many of its applications, is widely published and generally distributed with, or in place of, its binary form. Developers who wish to draw upon the existing base of GNU/Linux source code are obligated by licensing agreements to publish the source code of whatever software tools and applications they develop for public distribution, so that end users can inspect and modify it as necessary. GNU/Linux and other so-called 'open source' operating systems continue to provide a lively base of software development in the United States and around the world, primarily due to the multitude of individual programmers who use the GNU/Linux base of source code and add to it. Because the source code is generally public, however, any attempt to implement GNU/Linux tools to interoperate with the digital television protection scheme outlined by the BPDG is unlikely to meet the "robustness and compliance" requirements laid out by the BPDG report. Indeed, published source code makes GNU/Linux tools inherently 'tamperable.'" *See* Consumer Groups Comments at 22, footnote 39.

the capability to add such software) is routinely considered to be a feature of any complete operating system for general-purpose computers.[49] (Such a rule would damage Microsoft as well, since competition with open-source software sources has led the software giant to continually and quickly refine its products. Lack of such competition, in turn, damages consumer choice in the digital marketplace.)

IV. THE COMMISSION IS ALREADY EMPOWERED JURISDICTIONALLY TO IMPLEMENT A "MODEST PROPOSAL" THAT SHOULD ALLAY CONTENT HOLDERS' FEARS ABOUT REDISTRIBUTION OF DTV CONTENT OVER THE INTERNET.

A. Copyright Holders May in Fact be Fearful of Loss of Control over HDTV Content.

Even though proponents of the broadcast flag have provided no evidence that unauthorized copying of high-quality DTV content is occurring[50] and even though, as a factual matter, HDTV content is not likely to be copyable in undegraded form over "networks such as the Internet" in the near future, some content providers may be genuinely fearful[51] that HDTV-

[49] GNU/Linux, an open-source software project designed to promote software-defined radio (SDR) already has the capability to demodulate and present HDTV in software. *See* HDTV Snapshots, *at* www.gnu.org/software/gnuradio/images/hdtv-samples.html.

[50] *See generally supra* Section II.

[51] The Internet and computer technologies, partly as the result of the rapidity of their adoption, have been the triggers for other a number of social panics, including panics about potential computer crime, so-called "identity theft," the use of encryption by criminals, distribution of information about the making of bombs, online defamation and so-called "Internet stalking," and so on. For a general discussion of these social panics, *see* Mike Godwin, "Fear of Freedom: The Backlash Against Free Speech on the Net," *Cyber Rights: Defending Free Speech in the Digital Age* (Times Books, 1998), Chapter 3. Fear of HDTV file-trading over the Internet may qualify as yet another Internet-triggered social panic, a hypothesis that is especially likely given that there is far less evidence of HDTV file-trading than there is for any of the other potential problems listed in the first sentence of this footnote. The Consumer Groups offer no opinion on the frequently stated assertion by some critics of the broadcast-flag proposal that the proposal represents less an effort to protect HDTV than an effort to gain some design control over, and some slowing of what is perceived as disruptive innovation in, the information-technology sector. But we note some of the proponents of the broadcast-flag scheme also promoted the Consumer Broadband and Digital Television Promotion Act introduced by Sen. Ernest Hollings last year. *See* Drew Clark and Bara Vaida, "Digital Divide," National Journal's Technology Daily, Sept. 6, 2002, *available at* http://nationaljournal.com/about/njweekly/stories/2002/0906nj1.htm.

Described in general terms, that bill would have mandated that virtually all digital technologies be designed in the future to monitor all digital data for some kind of flag or watermark that signified whether the data were commercial content. In the absence of any evidence of a problem regarding retransmission of HDTV content, it has been suggested to us that the "real" purpose of the broadcast-flag proposal has been to gain both a greater hold over product design in the IT sector and an incremental step toward an eventual copyright-control architecture like that proposed in the Hollings legislation. We have been unable, however, to confirm this suggestion.

quality file-trading is a soon-to-be-manifested problem that needs to be resolved quickly. If, as Veridian suggests in its Reply Comments, "one problem identified by the Commission and by many commenters exists and is an acute one: copyright holders are reluctant to permit the distribution of high-value, *e.g.*, high definition programming without the safeguard of digital copy protection,"[52] then we can discuss that problem (copyright holders' reluctance) as one that is analytically independent of the question of whether there is actually a problem posed by file-trading of HDTV content on "networks like the Internet."

B. The Fact That HDTV Content is "Effectively Impossible" to Copy Over "Networks Such as the Internet" Suggests that Higher-Definition DTV Formats Should be Mandated by the Commission.

In the *Fourth Report and Order*, as we have seen in Sec. III(A), *supra*, the Commission determined not to dictate video formats for ATSC broadcasting. This decision was based partly on computer manufacturers' wish that then-existing computer monitors be able to display DTV visual content. For this reason, the Commission did not require that all DTV be broadcast in true high-definition formats such as 720p or 1080i, but also allowed for ATSC standard-definition television (SDTV), which consists of only 480 lines from top to bottom, as does NTSC (analog) television. In 1996, most computer monitors probably could not have displayed DTV content at resolutions higher than 480 from top to bottom. Since 1996, however, pixel density on low-cost computer monitors has conspicuously improved,[53] so the argument for preserving lower-resolution ATSC formats is less compelling than it was seven years ago.

Consider that one hour of 720p programming, as a full-resolution MPEG-2 file, will add up to 50 billion bits, and one hour of 1080i programming, when reduced to a full-resolution MPEG-2 file, will total about 70 billion bits. By comparison, an hour of 480p content, reduced to MPEG-2, adds up to about 14.5 billion bits, and an hour of 480i content, reduced to MPEG-2, will total about nine billion bits.

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[52] Veridian Reply Comments at 14.

[53] For example, the Apple laptop on which these comments are being composed has a monitor whose 1280-by-854 pixel resolution can display 720p, 16:9 content in full resolution. Furthermore, it can be connected to displays with even higher resolution.

Finally, consider that several participants in this proceeding have stated or shown that an hour of HDTV content will, under the best possible theoretical conditions, take 14 to 18 hours to download, and most likely will take far more.[54] This suggests an immediate regulatory step the Commission could take, well within its established quality-of-signal jurisdiction, that would significantly reduce the likelihood of successful Internet transfers of HDTV files: the Commission could mandate that all broadcasters move by a date certain to formats of 720p or higher. Put another way, the Commission could "wipe SDTV off the table" and, in doing so, could significantly diminish the chance that any digital television is copied without authorization over the Internet through a quality-of-signal mandate that would effectively increase theoretical download times three to seven times. If there is any single factor that our research has determined will reliably reduce the possibility of uploads and downloads of full-resolution digital-television, it is the factor of increasing file size. The easiest way to ensure that DTV file sizes are large is to mandate HDTV higher-resolution formats, starting at 720p. That simple step would be so demonstrably effective that it should make at least some content producers more comfortable with releasing high-quality content for over-the-air broadcasting.

Of course, we realize some participants in this proceeding — notably Fox Entertainment Group, whose "widescreen" digital format is based on a top-to-bottom line count of 480, which doesn't qualify as true HDTV — might be temporarily inconvenienced by such a mandate. We also know, however, that Congress has made clear that ultimately broadcasters will have to move to true HDTV formats. So what we are suggesting here is a mandate that merely accelerates an inevitable transition to true HDTV for everyone. Moreover, by accelerating the move to true HDTV formats, the Commission could accelerate consumer adoption of HDTV, since, once all

[54] *See e.g.,* Consumer Groups Comments at Appendix II, page 13; CCIA Comments at 10. *See generally* Reply Comments of Raffi Krikorian, where empirical research into actual throughput of file transmission of HDTV files demonstrates that transmission of such large files may be "effectively impossible" even on high-grade consumer or academic broadband connections. Many factors, including those discussed *supra* in Section II, will normally cause transfer of large files to be exceedingly difficult or impossible. In addition, consider that HDTV formats are already compressed -- this is why they are so effective in communicating so much more information in the same bandwidth required by analog television -- so cannot be compressed much further without degradation in quality.

content is broadcast in HDTV format, more consumers will be exposed to it.[55] Should content providers want still more security (although they should hardly need it), the Commission could make clear that over-the-air broadcast HDTV content could be encrypted at the source, and could set functionality standards for such encryption, following a scheme such as that set forth by Veridian in its initial Comments.[56]

V. THE COMMISSION DOES NOT HAVE EITHER THE EXPLICIT OR THE ANCILLARY AUTHORITY NECESSARY TO REQUIRE CONSUMER ELECTRONICS DEVICES AND COMPUTERS TO RECOGNIZE AND OBEY A DIGITAL BROADCAST FLAG

MPAA, *et al.* argue that the Commission has both explicit jurisdiction under 47 USC § 336 and ancillary jurisdiction under Title I of the Communications Act to require consumer electronics devices and computers to recognize and obey a digital broadcast flag.[57] They are incorrect on both counts.

As discussed *below*, when Section 336 is ***read in its entirety***, it is clear that the provision only grants the Commission explicit authority to take certain actions with respect to 1) initial licensing of DTV frequencies and 2) regulations permitting DTV licensees to offer "ancillary and supplementary" (subscription) services. Adoption of a broadcast flag scheme does not fall under either of these two categories, and MPAA, *et al*. do not contend otherwise.

Nor does the Commission have ancillary jurisdiction under *U.S. v. Southwestern Cable* and its progeny to require digital media products to adopt a broadcast flag. First, contrary to what MPAA contends, the Commission has ***never*** asserted jurisdiction over consumer electronics products without a mandate from Congress. Second, *Southwestern Cable* does not give the Commission free license to regulate any and all communications media whenever a third

[55] Our experience with the DTV transition so far suggests that mere 480p, even when plentiful as on Fox, is not compelling enough to accelerate adoption of digital television among consumers. Furthermore, this measure could be coupled with broadcasters' use of the Internet to deliver secure HDTV content — albeit very slowly and asynchronously, given the Internet's current and long-term bandwidth limitations. For an outline of how such netcasting could nevertheless promote HDTV, *see* Consumer Groups Comments at Appendix II, "Harry Potter and the Prisoners of the DTV Transition."

[56] See Veridian Comments at 2-4.

[57] *See* MPAA, *et al*., Comments at 29-42.

party claims that "the public interest, convenience and necessity" is implicated. Without substantial evidence that a broadcast flag scheme is necessary to preserve free over-the-air television, the Commission may not adopt such a scheme. As discussed in great detail in Section II, above, MPAA, *et al*. and other proponents of the flag have not provided one shred of evidence that 1) that there currently or in the near future will be a pervasive problem of illegal unauthorized distribution of digital TV content; or 2) that such unauthorized distribution, even if it does occur, "could [cause] the destruction of broadcast television programming as we currently know it."[58]

As the Commission well knows, the federal courts, and particularly the D.C. Circuit, have shown that they will not uphold FCC regulations promulgated in the "public interest" without substantial evidence that those regulations are necessary to accomplish their alleged goals.[59] Therefore, the Commission should tread lightly before asserting its authority where it never has before, particularly in light of the dearth of proof that a broadcast flag is necessary to achieve a regulatory goal permitted under the Communications Act.

A. Nothing in 47 USC §336 Confers Authority on the Commission to Require Consumer Electronics Devices and Computers to Obey a Broadcast Flag.

MPAA argues that "[b]oth individually and together," Sections 336(b)(4) and 336(b)(5) of the Telecommunications Act of 1996 give the Commission the express authority to implement a broadcast flag mandate.[60]

Plain and simple, this argument ignores the plain language and structure of the statute. The statute states, in relevant part:

> Sec. 336 [47 U.S.C. 336] BROADCAST SPECTRUM FLEXIBILITY.
>
> (a)COMMISSION ACTION.—If the Commission determines to issue additional

[58] MPAA, *et al*., Comments at 10.
[59] *See supra* footnote 18 citing *Fox Television Stations* v. *FCC*, 280 F.3d 1027 (DC Cir. 2002); *Sinclair Broadcasting v. FCC*, 284 F.3d 148 (DC Cir. 2002); *Time Warner v. FCC*, 240 F.3d 1126 (DC Cir. 2001).
[60] MPAA, *et al*., Comments at 30.

licenses for advanced television services, the Commission—

(1) should limit the initial eligibility for such licenses to persons that, as of the date of such issuance, are licensed to operate a television broadcast station or hold a permit to constrict such a station (or both); and

(2) shall adopt regulations that allow the holders of such licenses to offer such ancillary or supplementary services on designated frequencies as may be consistent with the public interest convenience, and necessity.

(b) CONTENTS OF REGULATIONS.—***In prescribing the regulations required by subsection (a),*** the Commission shall—

***

(4) adopt such technical and other requirements as may be necessary or appropriate to assure the quality of the signal used to provide advanced television services, and may adopt regulations that stipulate the minimum number of hours per day that such signal must be transmitted; and
(5) prescribe such other regulations as may be necessary for the protection of the public interest, convenience, and necessity.

Emphasis added.

As the Consumer Groups and others describe in detail in their Comments, the mandates of Section 336(b)(4) and (b)(5) cannot be divorced from Section 336(b), which narrowly limits any regulations the Commission adopts pursuant to 336(b)(4) and (5) to those necessary for ***"prescribing the regulations required by subsection (a)."***[61] Subsection (a), 47 USC §336(a), pertains only to 1) regulations governing the initial grant of DTV licenses (a1); and 2) regulations governing ancillary and supplementary services, which are subscription services provided by digital TV broadcasters.[62]

Thus, whatever the language of Sections 336(b)(4) and (b)(5) might say standing alone,[63] when viewed in context of the entire statute, they clearly do not confer authority on the Commission to require digital media devices to obey a broadcast flag, because such a mandate is

[61] *See* Consumer Groups Comments at 26-28; IT Coalition Comments at 5-7.
[62] The Commission has already ratified this reading of the statute. *Fees for Ancillary or Supplementary Use of Digital Television Spectrum*, FCC No. 98-303, at ¶2 (November 19, 1998).
[63] MPAA, *et al*. do not even attempt to address how a broadcast flag mandate has any relation to the *quality* of a DTV signal as is required by Section 336(b)(4).

unrelated to the regulations governing the initial grant of DTV licenses or regulations governing ancillary and supplementary DTV services.[64]

B. The Commission Has Never Regulated Consumer Electronics Devices in the Absence of Express Authority from Congress

MPAA, *et al*. state that "[t]he Commission historically has regulated various characteristics of television reception equipment in order to ensure the integrity of the terrestrial broadcast television system."[65] In support of this statement, they cite, *inter alia*, to regulations that require receivers to be capable of receiving all over the air television channels, require set manufacturers to be capable of providing closed captioning, and require incorporation of the V-Chip.[66]

However, as Consumer Groups stated in our initial Comments, these regulations were all promulgated pursuant to an Act of Congress.[67] While MPAA, *et al*. cite to the Commission's decision in *Review of the Commission's Rules Governing Color Television Transmissions*, 41 FCC 658 (1953) (*Color TV Decision*) as evidence to the contrary, that decision does not support their argument. The *Color TV Decision* only set standards for the color TV *signal*, not the color TV *receiver*. Those standards required that the signal be able to be viewed on a "receiver that is simple to operate in the home…and is cheap enough in price,…" but it did not require television set manufacturers to produce such receivers.[68]

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[64] MPAA, *et al*. argue that their reading of the statute is supported by letters sent to the Commission last year by Reps. Tauzin and Dingell and Senator Hollings, which state that the Commission has the authority under Section 336 to promulgate a broadcast flag statute. MPAA, *et al.* Comments at 30. Putting aside the fact that equally powerful members of the same Congress strongly disagree, *see* Letter from Senate and House Judiciary Committee Chairmen Leahy and Sensenbrenner to FCC Chairman Powell (Sept 9, 2002), statements by members of the 107th Congress do not override the plain language of the statute and the legislative history of the statute, which was passed by the 104th Congress.

[65] MPAA, *et al*., Comments at 31.

[66] *Id.*

[67] Consumer Groups Comments at 26.

[68] *Color TV Decision* at ¶8.

C. The Commission Cannot Assert Ancillary Jurisdiction in the Absence of Evidence that a Broadcast Flag is Necessary to Preserve Free, Over-the-Air Broadcasting.

Not surprisingly, MPAA, *et al.* primarily rely upon *US v. Southwestern Cable*[69] for their assertion that the Commission has ancillary jurisdiction to require digital media products to obey a broadcast flag.[70] Their basic argument can be restated like this: under *Southwestern Cable,* the Commission has the jurisdiction to engage in any regulatory action as long as its purpose is to protect against real or even perceived[71] harm to terrestrial broadcast television.

If the MPAA, *et al*.'s interpretation is correct, the implications would be staggering. The Commission would be free to engage in whatever regulation it deemed fit, so long as it could make the claim (but not necessarily provide any evidence) that the purpose of the regulation was to protect broadcasting, or as MPAA, *et al*. claim, "to advance the underlying policy imperatives of the Communications Act."[72]

But the MPAA, *et al*. read *Southwestern Cable* far too broadly. As the DC Circuit stated in construing *Southwestern Cable,* it is not enough for the Commission to merely claim that its action is somehow "in the public interest:"

> [T]he allowance of "wide latitude" in the exercise of delegated powers is not the equivalent of untrammeled freedom to regulate activities over which the statute fails to confer, or explicitly denies, Commission authority. It has been repeatedly recognized that Commission power over the communications industries is not unlimited, either as to the construction of the "public convenience, interest or necessity" standard as applied to activities clearly within its jurisdiction, or as to the extension of its jurisdiction to activities affecting communications.[73]

This is particularly true where, as here, there is no evidence in the record that the regulation requested is necessary to accomplish the intended goals. In the *NARUC* case, the

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[69] 392 U. S. 157 (1968)
[70] MPAA, *et al*., Comments at 32-33.
[71] The ***potential*** harms at issue here raise precisely the type of issue that confronted the Commission in *Southwestern Cable*…." MPAA, *et al*., Comments at 35 (emphasis added).
[72] MPAA, *et al*., Comments at 36.
[73] *NARUC v. FCC*, 533 F.2d 601, 618 (D.C. Cir. 1976).

court held that the Commission lacked the authority to preempt state and local regulation of cable access channels for the purpose of requiring those channels to provide two-way point to point communications. The Commission claimed that such regulations were needed, *inter alia,* to ensure that future revenues from such services would go to finance other, less profitable cable activities, and not into the pockets of state and local agencies. While the D.C. Circuit begrudgingly accepted that the proposed regulations might somehow be related to the Commission's power to regulate broadcasting, the court rejected the Commission's argument because of:

> [i]ts highly speculative character. The Commission has itself conceded that "at present there are few, if any, proven, economically viable uses for two-way cable communications." The perceived necessity to require installation of a two-way capability, rather than allowing market forces to bring about such installations, is further evidence of the dubious economic character of two-way communications via cable in the immediate future. We therefore conclude that this argument must fail for lack of evidentiary support.[74]

As discussed in detail in Section II, *above*, the proponents of a broadcast flag scheme have not made the case, other than a few bald assertions, that such a flag is necessary to preserve terrestrial broadcasting, or even that it is necessary to accelerate the transition to digital broadcasting. Indeed, even MPAA, *et al*. state that the harms from unauthorized distribution are "potential."[75] In the absence of compelling evidence that requiring digital media products to obey a broadcast flag is necessary to preserve terrestrial broadcasting, the Commission has no authority to adopt such a mandate.

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[74] *Id.* at 614-615 (footnotes omitted).

[75] MPAA, *et al*., Comments at 35. As discussed above, the unsupported assertions of harm are many. *See* MPAA, *et al*., Comments at 8-10. "***We can expect*** that producers of compelling programming…***will consider*** instead limiting such programming to more secure channels…." "The DTV transition ***may be seriously threatened if***, due to threat of piracy, valuable programming ceases to be available for broadcast…" "***The result could be*** the destruction of broadcast television programming as we currently know it." *Id.* (Emphases added).

CONCLUSION

Nothing in the questions Consumer Groups raise or the arguments we present in these Reply Comments should be interpreted by the Commission as inconsistent with our basic support of the policies behind the Copyright Act and of the protection of copyrighted works – that the law of copyright ultimately leads to greater consumer choice of, and access to, creative works. Furthermore, as our initial Comments and Reply Comments make clear, we do not categorically oppose digital-rights-management technologies, so long as such technologies are consistent with reasonable consumer expectations, do not extend the scope of copyright protection beyond the limits imposed in the Copyright Act, and are well-designed and narrowly crafted to resolve a substantiated problem.

Unfortunately, that is not the sort of problem or the sort of solution that we have been presented with in this proceeding. The astonishing lack of evidence behind claims of any current or imminent problem facing copyrighted high-quality digital works transmitted over airwaves gives us pause — we have always believed the case for the broadcast flag was thin, but have been amazed to discover that the evidence comes close to being nonexistent. Not only is there a lack of evidence that unauthorized retransmission of HDTV is now occurring or will occur in the foreseeable future over "networks like the Internet," but there also is no evidence that the broadcast flag will stem such unauthorized transmission, or that it will be more effective than alternative methods, such as encryption at the source and/or increasing the file size associated with the content by mandating HDTV formats. (The latter of these options is, of course, a measure the Commission could take unilaterally and is well within its quality-of-signal jurisdiction.) Furthermore, there is no evidence that any of these measures will promote the transition to digital television, a concern which, despite all the discussion of content owners' fears, ought to be at the heart of this Commission's deliberations.

We are concerned with the question of whether it is prudent for the Commission to proceed to attempt to erect a regulatory framework aimed at protecting digital-television content

(but that, of necessity, must reach beyond the range of devices over which the Commission heretofore has been determined to have jurisdiction) in the absence of evidence that such a proposal will be effective, and in the absence of evidence that the particular problem identified by some content companies will ever occur, especially since doing so poses grave risks of economic and noneconomic costs to consumers. We necessarily conclude that the Commission does not yet have either the authority or the factual record necessary to support proposed rules in this docket.

Respectfully Submitted,

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